A communication unit (101) comprises a data store (203, 205) which comprises a set of content relationships between content items of a plurality of content items and at least one context sensitive user preference. The user preference comprises at least one content relationship preference which is context dependent. A context processor (207) provides context data associated with a communication involving a remote communication unit (103). A content processor (201) selects at least a first content item for the communication from the plurality of content items in response to the set of relationships, the user preference and the context data. A transmission controller (209) attaches the first content item to a transmission to the remote communication device (103). The invention may allow a flexible, user friendly and possibly automatic attachment of content items that reflect the current situation and user preferences.
A COMMUNICATION SYSTEM, COMMUNICATION UNIT AND METHOD OF OPERATION THEREFOR

5 Field of the invention

The invention relates to a communication system, communication unit and method of operation therefor and in particular, but not exclusively, to personalisation of communication services.

Background of the Invention

15 It is known that direct human communications involve not only communicating information by words but that significant information is provided by associated information such as tone of voice, intonation, body language, facial expression etc. Also, it is known in social sciences that the cognitive overload that may result from trying to understanding information is reduced when this communication is provided in a way that resembles conventional direct face-to-face communication.

20 Digital communication has enabled a new mode of communication styles to emerge that is a convergence of written format with the informal voice communication exchange.

30 Thus, communication services are increasingly moving towards personalized user services. For example, it is becoming increasingly popular for users to exchange signatures or other forms of personal content when
initiating or during a communication. For example, a communication session may include the participants exchanging large amounts of small personal content, such as ring tones, photos, sayings (cookies), favourite music (list), information nodes etc. Such information may for example be exchanged for a voice communication or as part of emails, SMS etc. Indeed, research shows that users of telecommunication services desire further flexibility and options for providing additional information that allows a closer similarity to conventional face-to-face communication. For example, there is an increasing trend and desire to include features such as emoticons, italics, smiley faces etc in e.g. text based or voice based communications.

However, inclusion of such information tends to be very limited and/or very cumbersome. For example, Instant Messaging services have been developed wherein a user may manually include various content items such as emoticons or smiley faces. However, this is extremely cumbersome and impractical except for extremely simple and infrequent addition of extra content.

Instant Messaging may also allow some automatic sharing of user characteristics from a sender to a receiver. However, such data tends to be static and provide very limited additional information.

Hence, a system allowing provision of additional information would be advantageous and in particular a system allowing increased flexibility, low complexity, facilitated association of content items to communications, improved and/or increased user
information and/or improved performance would be advantageous.

5 Summary of the Invention

Accordingly, the Invention seeks to preferably mitigate, alleviate or eliminate one or more of the above mentioned disadvantages singly or in any combination.

According to a first aspect of the invention there is provided a communication unit comprising: a data store comprising a set of content relationships between content items of a plurality of content items and at least one context sensitive user preference, the user preference comprising a context dependent content relationship preference; means for providing context data associated with a communication involving a remote communication unit; content means for selecting at least a first content item for the communication from the plurality of content items in response to the set of content relationships, the user preference and the context data; and means for attaching the first content item to a transmission to the remote communication device.

The invention may allow an improved communication service and may in particular allow a facilitated and/or improved association of content items that may provide additional information. In some embodiments, the selection and attachment of a content item may be performed automatically based on a user's preference settings. The use of content relationships and associated context sensitive user preferences may particularly provide a
high degree of flexibility while ensuring facilitated or even automated management and content item selection.

According to a feature of the invention, the communication unit comprises means for modifying the content relationships in response to the generation of the first content item.

This may allow improved and/or facilitated provision of flexible and/or dynamic additional information. Specifically, the relationships may dynamically be updated to reflect previous content item selections. The term "modifying" includes generation of new relationships.

According to another aspect of the invention there is provided a communication system comprising: a first communication unit comprising: a data store comprising a first set of content relationships between content items of a plurality of content items and at least a first context sensitive user preference, the first user preference comprising a context dependent content relationship preference, means for providing first context data associated with a communication involving a second communication unit, content means for selecting at least a first content item for the communication from the plurality of content items in response to the first set of relationships, the first user preference and the first context data, and means for attaching the first content item to a transmission to the remote communication device; and

the second communication unit comprising: a data store comprising a second set of content relationships between
content items of a plurality of content items and at least a second context sensitive user preference, the second user preference comprising a context dependent content relationship preference, means for providing second context data associated with the communication, modification means for generating a presentation content item from the first content item in response to the second set of relationships, the second user preference and the second context data, and means for presenting the presentation content item to a user of the second communication unit.

The invention may allow an improved communication service and may in particular allow a facilitated and/or improved association of content items that may provide additional information. A further improved user experience may be achieved by the content item being further adapted at the receiving end in response to context data associated with the receiving communication unit. The functionality used for content item processing may be similar and identical when transmitting and receiving content items. Indeed, the same functionality may be used by a communication unit to generate content items for transmissions and adapting received content items for presentation. Specifically, the functionality of the first and second communication unit may be similar or identical.

According to another aspect of the invention there is provided a method of operation for a communication unit, the method comprising: providing a set of content relationships between content items of a plurality of content items and at least one context sensitive user preference, the user preference comprising a context
dependent content relationship preference; providing context data associated with a communication involving a remote communication unit; selecting at least a first content item for the communication from the plurality of content items in response to the set of relationships, the user preference and the context data; and attaching the first content item to a transmission to the remote communication device.

These and other aspects, features and advantages of the invention will be apparent from and elucidated with reference to the embodiment (s) described hereinafter.

15 **Brief Description of the Drawings**

Embodiments of the invention will be described, by way of example only, with reference to the drawings, in which

20 **FIG. 1 illustrates a communication system comprising communication units in accordance with some embodiments of the invention;**

**FIG. 2 illustrates a communication unit in accordance with some embodiments of the invention;**

**FIG. 3 illustrates a communication unit in accordance with some embodiments of the invention;** and

**FIG. 4 illustrates a method of operation for a communication unit in accordance with some embodiments of the invention.**
Detailed Description of Some Embodiments of the Invention

FIG. 1 illustrates a communication system comprising a first communication unit 101 communicating with a second communication unit 103 via a suitable communication network 105. The communication units 101, 103 may for example be mobile cellular terminals (e.g. mobile phones or 3rd generation User Equipments (UEs)) communicating over a cellular communication network, such as e.g. GSM or UMTS, or may e.g. be computer terminals communicating over a suitable data network such as a Wireless Local Area Network (WLAN) and/or the Internet.

In the system, a user of the first communication unit 101 can communicate with a user of the second communication 103 using e.g. a voice or text based communication service. For example, the communication units 101, 103 may support a voice conversation service or an instant messaging or email communication.

In order to enhance the communication experience, the system furthermore allows various content items to be associated with the communication. For example, a voice or text communication may be enhanced by the addition of background tunes, moving or static visual images, emoticons, smiley faces etc. In the system, the user may manually select and attach such content items. However, in addition content items may be automatically selected and attached by the communication units 101, 103. Specifically, the communication units 101, 103 comprise advanced functionality for automatically selecting suitable content items based on user preferences, context.
data and relationships between content items. The functionality may allow a dynamic selection and attachment of content that specifically reflects the current situation and user experience.

FIG. 2 illustrates a communication unit in accordance with some embodiments of the invention. Specifically, FIG. 2 may illustrate functionality of the first communication unit 101 (as well as the second communication unit 103) and will be described with reference thereto.

The first communication unit 101 specifically comprises a content processor 201 which is arranged to select a content item which may be attached to a communication between the first and second communication units 101, 103. The content processor 201 may dynamically select content item(s) for the current communication which can then be presented to a user of the second communication unit 103.

The content processor 201 is coupled to a content relationships store 203 which stores content relationships between content items of a plurality of content items. The content relationships may for example combine content into groups of similar content and/or relating to similar events, moods etc. Specifically, metadata may be generated or retrieved for each content item and may be used to define relationships between these. Furthermore, the relationships may be dynamically updated to reflect the current situation and use of content items. For example, the plurality of content items may be divided into different sets of content items
and a number of correlated or uncorrelated relationships between different sets may be generated and stored in the content relationships store 203.

The content processor 201 is furthermore coupled to a user preference store 205 which stores a context sensitive user preference for the user of the first communication unit 101. The user preference comprises a context dependent content relationship preference which specifically can specify a number of relationship criteria that must be met by a content item to be attached to the communication. The user preference is context sensitive and depends on the context of the current communication. For example, the user preference may depend on e.g. an identity associated with the second communication unit 103.

The content processor 201 is furthermore coupled to a context processor 207 which is arranged to provide context data associated with a communication involving a remote communication unit. It will be appreciated, that any suitable context data may be used including for example a communication characteristic of the communication, a characteristic associated with the current location or use of the first communication unit 101 or a characteristic of an application utilising the communication etc.

The content processor 201 is arranged to select one or more content items for the communication in response to the content relationships, the user preference and the context data. Specifically, the content processor 201 can retrieve context data from the context processor 207 and
use this data to retrieve a specific user preference suitable for this context situation from the user preference store 205. The user preference can specifically specify a set of content relationships that must be satisfied for any content selected to be attached to the communication. The content processor 201 can accordingly retrieve the content relationships from the content relationships store 203 and analyse these to identify any set of contents that meets the criteria imposed by the user preference. The content processor 201 can then select one or more content items from this set. The content processor 201 is coupled to a transmission controller 209 which is arranged to attach the selected content item(s) to a transmission to the remote communication device. It will be appreciated that any suitable means of communicating information allowing the second communication unit 103 to identify the selected content item may be used. For example, the transmission controller 209 may include data identifying the selected content item and the second communication unit 103 may use this identification to retrieve the selected content item from an internal or external content store. As another example, the transmission controller 209 may include the actual content item in a transmission to the second communication unit 103. The actual content item or an indication of the content item may be embedded in the communication to the second communication unit 103 or may be communicated independently of the main communication. The described approach may allow a flexible, automated and practical way of enhancing a communication service to provide additional information. The user of the first
communication unit 101 may use a very simple interface to control or manage the selection of content items to be attached. Furthermore, very complex and advanced content addition can be achieved.

As a specific example, the user of the first communication unit may set up a simple preference, such as "Attach a different photo of my son every time I send a message to my mother". This may specifically be achieved by setting up a relationship criterion that a selected content item should meet. For example a content relationship criterion may be set up that requires that the selected content item should belong to a set of content items corresponding to photos of the user's son and should not belong to a set of content items corresponding to content items that have already been sent. Accordingly, when a new communication is initiated, the context processor 207 may provide context data that identifies the destination as the second communication unit 103. The second communication unit 103 can be associated with the user's mother in an address book thereby allowing the content processor 201 to retrieve the corresponding stored user preference when receiving the context data. Thus, the content processor 201 retrieves the criterion stored for calls to the user's mother. The content processor 201 then proceeds to evaluate the relationship criterion and the currently stored relationships. It then selects the content item as a photo of the son which has not previously been transmitted. This picture is attached to the communication which is transmitted to the second communication unit 103. When receiving the photo, the
second communication unit 103 can proceed to present the photo on a display of the device.

It will be appreciated, that any suitable approach for generating a user preference may be used. For example, the first communication unit 101 can comprise a suitable user interface such as a keyboard allowing the user to manually enter a user preference. For example, the user can use the keyboard to specify the relationships that should be met for a given context.

Alternatively or additionally, the communication unit 101 may be arranged to determine the user preference from characteristic(s) of content items attached to previous communications to the second communication unit 103. Thus, the user preference may be determined by evaluating the operation of the communication units during e.g. manual operation and may use learning techniques to establish a pattern which can be defined as the user preference.

For example, the first communication unit 101 may detect that whenever the user makes a call to the second communication unit 103, he/she manually attaches a picture. The communication unit 101 may furthermore analyse metadata of the attached photos to determine common characteristics. In the specific example, it will be detected that all pictures transmitted to the second communication unit 103 include an identification of the user's son. Accordingly, it may present the user with the option to store a user preference for attaching a different picture of the user's son whenever a call is made to the second communication unit 103. If the user
preference is accepted by the user, it is stored in the user preference store 205 and used for automatically attaching photos in the future.

Thus, in the system the communication unit 101 may create a personalized knowledge-base comprising content data information which may be used to create content relationships. In addition, context data may be generated by applications supporting or using the communication service. As many applications today generate or process metadata relating to the involved applications and content, such data may be readily available.

The system then uses such information in a reasoning process to identify suitable personalized content. This approach enables or facilitates automated packaging of content to be based on users preferences e.g. when sending to this user or integrating with my calendar to make a wake-up call use "sand in my shoes" tune to deliver my call/event. In the specific example, the personalization is achieved through the use of the personalized knowledge-base, a preference model for the content and a thesaurus-like comparison/evaluation mechanism which will be described further in the following.

The system allows a flexible and enhanced user experience which may for example allow automated selection of content that meets complex user preferences such as: make today's content slightly different from yesterday's call content e.g. louder, smaller image, two images instead of one, background very bright, add a smiley face, update it with my latest photo of X etc. The system may
automatically modify the content addition or may e.g. suggest a modification for approval by a user. The system may also allow a preference to be manually set by the user or (semi) automatically generated from past performance. For example, preferences such as "if the communication content context is the same within 1 day then modify slightly", "change based on e.g. current weather, my location, my viewing history/tasks etc".

In the communication unit 101 of FIG. 2, the content processor 201 uses a mechanism which is related to a thesaurus clustering mechanism that can be applied to text documents and semantic word based metadata. A classic thesaurus is used to define relationships between words so that one word for example can be replaced by another.

In the current approach the content relationships are set up such that they can be used in the same way as classic thesaurus relationships.

Specifically, the content relationships may include a number of relationships indicating that a first subset of content items is synonymous with a second subset of content items. Specifically, two sets of content items may be determined to be synonymous if the content items of the sets meet a similarity criterion. It will be appreciated that any suitable similarity criterion may be used. For example, the similarity criterion may evaluate the metadata of different content items and consider the relationship to be met if a sufficient number of metadata categories have corresponding data for the content items.
Thus, specifically a synonym relationship may be indicated by a relationship operator $R_1$. This defines a relationship that is similar to a relationship between two terms that are synonyms of each other. Here the term synonym for content items can indicate a classical word based relationship where some metadata has similar or identical meanings or can e.g. indicate a similarity relation defined by a user preference (e.g. a family photo concept may be acceptable to replace one family photo of grandson with another when sending a message to grandparents).

Thus, the relationship $R_1$ may indicated that a set of content items meet a similarity criterion thereby indicating that one content item may be used to replace another.

Alternatively or additionally, the content relationships may include a number of relationships indicating that a first set of content items is a subset of a second set of content items.

For example a relationship $R_2$ can be defined for two content item sets to indicate that one content item set belongs to a broader category than the other. This is similar to a broader term definition in a word based classical approach where a relation may define that a term $t_1$ has a broader more general meaning than another term $t_2$. The opposite relationship $R_3$ may also be used.

Alternatively or additionally, the content relationships may include a number of relationships indicating that a
first set of content items is disjoint to a second set of content items.

For example, a relationship operator $R_4$ can be established to indicate that the sets of content items are disjoined in accordance with a suitable criterion. For example, the relationship operator can be used to indicate that a first set of content items which have already been attached to the communication is disjoint from a second set of content items which have not previously been attached to the communication.

Thus, specifically, the content relationships may include a number of relationships indicating that a first subset of content items have been attached to a previous communication to the second communication unit 103 and that a second subset of content items have not been attached to a previous communication to the second communication unit 103 where the first and second subset are different subsets of the same subset of content items, e.g. both subsets may be part of the set of content items corresponding to pictures of the user's son.

The defined relationship operators can be used to determine rules/content relationships of sets of content items where each set may comprise one or more content items. In the specific example the following rules can be used to establish a relationship between content items:

$$1. C_1 R_i C_2$$ means that instances of $C_1$ are the same as/or similar to $C_2$.
2. $Ci \text{ R}_2 C_2$ means that the instances of $Ci$ are a superset of the instances of $C_2$.

3. $Ci \text{ R}_3 C_2$ means that the instances of $Ci$ are a subset of the instances of $C_2$.

4. $Ci \text{ R}_4 C_2$ means that the instances of $Ci$ are disjoint from the instances of $C_2$.

Thus, the defined relationship operators allow a definition of content relationships similar to synonym relationships in a classical thesaurus. In addition to the synonymy, the operators allow other relationships including:

1. Correlation: which links two synonymy groups through the same father (hyponym)
2. Hypernymy (father/parent relationships)

Thus, for content items the set of relations $W=\{\text{Synonymy, Hypernymy, Correlation}\}$ can be defined similar to a word based thesaurus clustering mechanism.

As an example of how the content processor 201 may generate suitable content items is when a group of content items "G" are clustered together through the use of synonymy, using the thesaurus mechanism and the relationship that exists within that group, a function $f$ can be defined which will return all the content items within that group that are associated through the relationships which defined within the set of relationships $W$. 
Specifically, given a set of content items in a synonymy group (essentially any set of related content items) \( G \) and the relationship set \( W \) (which comprises a set of defined relationships that is used to reflect the user's preference such as photos of the user's son, previously sent items etc), the function \( f \) (a method that enables the matching of those content items with the specific relationships in order to generate a filtered list) is a function \( f(g, r) : G \times W \rightarrow 2^g \) which for each content item set \( g \) provides the set of content items that meets the relationships \( r \in W \) (e.g. the function filters out the set of photos that have been sent).

The following equation provides how the set of related content items are returned:

\[
 f(g, r) = \{ g' \mid g' \in G, r \in W, <g'rg> \text{ holds}\}
\]

This function thus provides a way of identifying all content items that have a particular relationship(s). The right hand side illustrates that the set of items and the set of relationships may well exist as either a super or sub set of the items returned (normally operation will expect it to be a superset). This function then creates a new cluster based on the new grouping through the relationship \( r \).

So for example, if a specific user preference is to use a different sunset photo each day when calling a specific user, the content item set \( g \) corresponding to the user's collection of sunset photos is evaluated by the function \( f \) using suitable relationships to provide the appropriate photos.
For example, the user may specify a user preference as a criterion of relationships that must be met. E.g. a user preference may be set corresponding to the preference "Attach a different photo of my son every time I send a message to my mother". This criterion may require the following relationships to be evaluated:

$C_i R_i C_2$: Meaning that instances of $C_i$ are similar to $C_2$ such that they may be used interchangeably. This may be used to create a set of candidate photos.

$C_3 R_4 C_4$: Meaning that the instances of $C_3$ are disjoint from the instances of $C_4$. In this case $C_3$ may correspond to the photos that have already been sent and $C_4$ may correspond to the pictures which have not yet been sent. Thus, the relationship allows an identification of the photos that have not been sent previously.

Thus, for example, the content processor 201 may use the relationship $C_i R_i C_2$ to generate a set of candidate photos and can then apply the relationship $C_3 R_4 C_4$ to that set in order to provide a set of suitable photos that have not previously been sent. In the specific example, the sets used in the relationships may thus include all the candidate photos, i.e. $C_1 + C_2$ may be equal to $C_3 + C_4$.

It will be appreciated that the content relationships may be continuously modified. For example, when a selected content item is attached to the communication it may be moved from belonging to one category to belonging to another category.
Also, it will be appreciated that the content relationships may be determined in response to characterising data for the content items. Specifically, metadata generated for the content items may be used to determine the relationships. For example a photo may have associated metadata indicating that the photo is a family photo including person A, B, C and a second photo may have metadata indicating that it is a picture of person A. In this case, the metadata evaluation may be used to generate a relationship indicating that the two photos both belong to a set of photos relating to person A.

It will be appreciated that different types of context data may be used in different embodiments. For example, in some embodiments, the context data may comprise an indication of the second communication unit 103 and the first indication unit 101 can be arranged to select different content items depending on which communication unit is involved in the communication. E.g. when initiating a call to the user's mother, the first communication unit 101 may automatically attach a picture of the user's son, whereas if the call is to another person another type of picture is attached.

As another example, the context data may comprise a characteristic of an application originating the transmission. For example, the communication may be initiated by a calendar application running on the first communication unit 101. In this case, the content processor 201 may select a content item which is particularly suitable for the calendar application. Furthermore, the calendar application may provide metadata relating to the communication, such as for
example the metadata indicating the event that resulted in the call being set up. The content processor 201 may furthermore determine the user preference depending on this event information context data and may accordingly select different content items depending on the events originating the call. For example, the first indication unit 101 may attach a different content item for a wake up alarm event than for a meeting reminder event.

As another example, the context data may comprise a location estimate for the first communication unit 101. For example, the first communication unit 101 may comprise a GPS receiver which can generate a location estimate. The content processor 201 may retrieve a specific user preference that corresponds to the current location. The selected content item may accordingly depend on the current location of the communication unit 101. For example, if the user is a frequent traveller he may set up the communication unit 101 to automatically include a picture of the flag of the country in which he currently is.

In some embodiments, the communication unit receiving a content item may furthermore be arranged to modify this content item. Specifically, a communication unit comprising functionality for selecting a content item to attach to a communication as previously described may also use this functionality to modify a received content item before this is presented to the user. Specifically, the receiving communication unit may replace a received content item with a synonymous content item depending on the current context of the receiving communication unit.
FIG. 3 illustrates a communication unit in accordance with some embodiments of the invention. Specifically, FIG. 3 may illustrate functionality of the second communication unit 103 (as well as the first communication unit 101) and will be described with reference thereto.

In the example, the second communication unit 103 comprises a content relationships store 301 and a user preference store 303 which operate equivalently to the content relationships store 203 and the user preference store 205 of the first communication unit 101. Thus, the content relationships store 301 stores a second set of content relationships between content items and the user preference store 303 stores a second context sensitive user preference.

In addition the second communication unit 103 comprises a context processor 305 which provides second context data associated with the communication. This second context data can specifically relate to the context of the second communication unit 103. As a specific example, the second context data can comprise an indication of a current mode of operation of the second communication device 103. For example, the context data can indicate whether the second communication unit 103 is operating in a normal mode or is operating in a silent mode wherein audio alerts are not generated by the second communication unit 103.

The content relationships store 301, the user preference store 303 and the context processor 305 are coupled to a modification processor 307 which operates in an equivalent way to the content processor 201 of the first
communication unit 101. Specifically, the modification processor 307 can generate a presentation content item from the content item attached to the communication by the first communication unit 101. The presentation content item can be generated in a similar way to the selection of the content item by the content processor 201 of the first communication unit 101.

For example, the modification processor 307 may retrieve the context data from the context processor 305 and use this to select a specific user preference from the user preference store 303. Based on the user preference, the modification processor 307 can evaluate the content item relationships to select a specific content presentation item. Particularly, the evaluation of the content relationships can be based on evaluating content relationships for the received content item.

Thus, as a specific example, the modification processor 307 can evaluate the content relationships identified by the user preference for the current context to identify a content item that may replace the received content item. The presentation content item can thus be selected as one having a suitable relationship with the received content item, and specifically can be selected as one that is similar to the received content item in some ways and different in other ways.

For example, if an audio content item is received and the second communication unit 103 is currently operating in a silent mode, a user preference may be extracted which causes relationships to be evaluated to identify a replacement visual content item having a corresponding
meaning. For example, a happy birthday tune may automatically be replaced by a happy birthday image.

The second communication unit 103 furthermore comprises a presentation controller 309 coupled to the modification processor 307. The presentation controller 309 is arranged to present the presentation content item to a user of the second communication unit 103. For example, the presentation controller 309 can present the visual content item on a display of the second communication unit 103.

It will be appreciated, that in some embodiments the presentation content item may be generated by modifying the received content item rather than necessarily replacing this by another content item.

Thus, in the example, the receiving second communication unit 103 also comprises reasoning and adaptation function using an approach similar to a word based thesaurus mechanism. However, the context of the second, communication unit 103 rather than the first communication unit 101 is used for the content adaptation. Thus, in the system, content may be selected and adapted based on the sender's context and preferences as well as the receiver's context and preferences.

It will be appreciated that the described system may provide many advantages including for example an enhanced user experience and specifically a more personalised experience that can reduce cognitive overload. This system may e.g. make an application more interesting to
the user and/or allow a user to easily provide a more personal experience and identity. Thus, the system may provide a more social and natural way of communicating while maintaining low complexity and facilitated user operation.

FIG. 4 illustrates a method of operation for a communication unit in accordance with some embodiments of the invention.

The method initiates in step 401 wherein a set of content relationships between content items of a plurality of content items and at least one context sensitive user preference is provided. The user preference comprises a context dependent content relationship preference.

Step 401 is followed by step 403 wherein context data associated with a communication involving a remote communication unit is provided.

Step 403 is followed by step 405 wherein a first content item is selected for the communication from the plurality of content items. The selection is in response to the set of relationships, the user preference and the context data.

Step 405 is followed by step 407 wherein the first content item is attached to a transmission to the remote communication device.

It will be appreciated that the above description for clarity has described embodiments of the invention with reference to different functional units and processors.
However, it will be apparent that any suitable distribution of functionality between different functional units or processors may be used without detracting from the invention. For example, functionality illustrated to be performed by separate processors or controllers may be performed by the same processor or controllers. Hence, references to specific functional units are only to be seen as references to suitable means for providing the described functionality rather than indicative of a strict logical or physical structure or organization.

The invention can be implemented in any suitable form including hardware, software, firmware or any combination of these. The invention may optionally be implemented at least partly as computer software running on one or more data processors and/or digital signal processors. The elements and components of an embodiment of the invention may be physically, functionally and logically implemented in any suitable way. Indeed the functionality may be implemented in a single unit, in a plurality of units or as part of other functional units. As such, the invention may be implemented in a single unit or may be physically and functionally distributed between different units and processors.

Although the present invention has been described in connection with some embodiments, it is not intended to be limited to the specific form set forth herein. Rather, the scope of the present invention is limited only by the accompanying claims. Additionally, although a feature may appear to be described in connection with particular embodiments, one skilled in the art would recognize that
various features of the described embodiments may be combined in accordance with the invention. In the claims, the term comprising does not exclude the presence of other elements or steps.

Furthermore, although individually listed, a plurality of means, elements or method steps may be implemented by e.g. a single unit or processor. Additionally, although individual features may be included in different claims, these may possibly be advantageously combined, and the inclusion in different claims does not imply that a combination of features is not feasible and/or advantageous. Also the inclusion of a feature in one category of claims does not imply a limitation to this category but rather indicates that the feature is equally applicable to other claim categories as appropriate. Furthermore, the order of features in the claims does not imply any specific order in which the features must be worked and in particular the order of individual steps in a method claim does not imply that the steps must be performed in this order. Rather, the steps may be performed in any suitable order.
CLAIMS

1. A communication unit comprising:
   a data store comprising a set of content relationships between content items of a plurality of content items and at least one context sensitive user preference, the user preference comprising a context dependent content relationship preference;
   means for providing context data associated with a communication involving a remote communication unit;
   content means for selecting at least a first content item for the communication from the plurality of content items in response to the set of content relationships, the user preference and the context data; and
   means for attaching the first content item to a transmission to the remote communication device.

2. The communication unit of claim 1 wherein the content relationships includes at least one relationship indicating that a first subset of content items are synonymous with a second subset of content items.

3. The communication unit of claim 1 wherein the content relationships includes at least one relationship indicating that a set of content items meet a similarity criterion.

4. The communication unit of claim 1 wherein the content relationships includes at least one relationship indicating that a first set of content items is a subset of a second set of content items.
5. The communication unit of claim 1 wherein the content relationships includes at least one relationship indicating that a first set of content items is disjoint to a second set of content items.

6. The communication unit of claim 1 wherein the content relationships includes at least one relationship indicating that a first subset of content items have been attached to a previous communication to the remote communication unit and that a second subset of content items have not been attached to a previous communication to the remote communication unit, the first and second subset being different subsets of a same subset of content items.

7. The communication unit of claim 1 wherein the communication unit comprises means for modifying the content relationships in response to the generation of the first content item.

8. The communication unit of claim 1 wherein the communication unit comprises means for determining content relationships in response to characterising data for the plurality of content items.

9. The communication unit of claim 1 wherein the user preference includes a criterion comprising a plurality of content relationships that must be met by the first content item; and the content means is arranged to generate the first content item in response to the criterion.
10. The communication unit of claim 1 further comprising input means for receiving a user input; and means for generating a user preference in response to the user input.

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11. The communication unit of claim 1 further comprising means for generating a user preference in response to a characteristic of content items attached to previous communications to the second communication unit.

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12. The communication unit of claim 1 wherein the context data comprises an indication of the remote communication unit.

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13. The communication unit of claim 1 wherein the context data comprises a characteristic of an application instigating the transmission.

14. The communication unit of claim 1 wherein the context data comprises a location estimate for the communication unit.

15. A communication system comprising:

- a first communication unit comprising:

  - a data store comprising a first set of content relationships between content items of a plurality of content items and at least a first context sensitive user preference, the first user preference comprising a context dependent content relationship preference,
  
  - means for providing first context data associated with a communication involving a second communication unit,
content means for selecting at least a first content item for the communication from the plurality of content items in response to the first set of relationships, the first user preference and the first context data, and means for attaching the first content item to a transmission to the remote communication device; and

the second communication unit comprising:

a data store comprising a second set of content relationships between content items of a plurality of content items and at least a second context sensitive user preference, the second user preference comprising a context dependent content relationship preference,

means for providing second context data associated with the communication,

modification means for generating a presentation content item from the first content item in response to the second set of relationships, the second user preference and the second context data, and

means for presenting the presentation content item to a user of the second communication unit.

16. The communication system of claim 15 wherein the modification means is arranged to replace the first content item with the presentation content item selected from a set of content items having a content relationship indicative of a similarity between content items.
17. The communication system of claim 15 wherein the second context data comprises an indication of a current mode of operation of the second communication device.

18. A method of operation for a communication unit, the method comprising:

- providing a set of content relationships between content items of a plurality of content items and at least one context sensitive user preference, the user preference comprising a context dependent content relationship preference;
- providing context data associated with a communication involving a remote communication unit;
- selecting at least a first content item for the communication from the plurality of content items in response to the set of relationships, the user preference and the context data; and
- attaching the first content item to a transmission to the remote communication device.
INTERNATIONAL SEARCH REPORT

International application No
PCT/US 07/82814

A CLASSIFICATION OF SUBJECT MATTER
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According to International Patent Classification (IPC) or to both national classification and IPC

B FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
USPC 707/1

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
USPC 707/1,10, 709/203,217,219, 705/1,10

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
PubWEST(USPT,PGPB,EPAB,JPAB), DialogPRO, WIPO, EPO, CITESEER, Google patents, Google scholar
Search Terms Used content relationship personalization communication system user preference data store profile store mode of operation previous communication similarity content item selection

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